# COTTONWOOD WATER DEPARTMENT (PWS 2250013)
# SOURCE WATER ASSESSMENT FINAL REPORT

**February 5, 2002**

## State of Idaho
## Department of Environmental Quality

## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for Cottonwood Water Department, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Cottonwood Water Department drinking water system consists of three active wells. Well #2 W Big and Well #4 North are the main sources of water for the city. Well #3 W Small is a backup well. All three wells rated moderate susceptibility rating to inorganic, volatile organic, synthetic organic, and microbial contaminants, with the exception of Well #3 Small that automatically rated high to microbial contamination because of total coliform detections in August 1993 and May 1994. The overall depth of the three wells and the geologic combination of basalt and clay has influenced the overall scores the most.

There are no significant water chemistry issues in the tested water. In August 1993 and May 1994, total coliform bacteria were detected in Well #3 W Small, but there have been no bacterial detections since that time. No synthetic organic contaminants have ever been detected. The volatile organic contaminant chloroform was detected in Well #3 W Small in May 1993, but this contaminant is a by-product of the chlorinating disinfection system and is not associated with the source water. The inorganic contaminants fluoride, barium, and nitrate have been detected, but at levels below the current maximum contaminant levels (MCLs) as set by the EPA. Though there have not been chemical problems with the system water, Cottonwood Water Department should be aware that the potential for contamination from the aquifer still exists.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Cottonwood Water Department system drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). Also, disinfection practices should be maintained and observed so volatile disinfection by-products do not enter the drinking water system. No chemicals should be stored or applied within the 50-foot radius of the wellheads. The Cottonwood Water Department should look into removing the road that is approximately 30 feet from Well #2 W Big. A contingency plan should be established to deal with any contamination and possible spills from Highway 95. As much of the designated

protection areas are outside the direct jurisdiction of the Cottonwood Water Department, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations encompass much urban and commercial land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there is a major transportation corridor through the Well #4 North delineation, the Idaho Department of Transportation should be involved in protection activities.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR COTTONWOOD WATER DEPARTMENT, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

### Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

### Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The local community, based on its own needs and limitations, should determine the decision as to the amount and types of information necessary to develop a drinking water protection program. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## Section 2. Conducting the Assessment

### General Description of the Source Water Quality

The public drinking water system for the Cottonwood Water Department is comprised of three ground water wells that serves approximately 941 people through approximately 440 connections. The wells are located in Idaho County, to the south of the City of Ferdinand, along Highway 95 (Figure 1).

There are no significant water problems currently affecting the Cottonwood Water Department source water. The inorganic contaminants (IOCs) fluoride, barium, and nitrate have been detected, but at levels below the maximum contaminant levels (MCLs) as set by the EPA. No synthetic organic contaminants (SOCs) have been detected in the well water. In August 1993 and May 1994, total coliform bacteria were detected at Well #3 W Small. In May 1993, the volatile organic contaminant (VOC) chloroform was detected at Well #3 W Small, but this chemical is a by-product of a chlorine disinfection system and not a problem with the source water.

### Defining the Zones of Contribution – Delineation

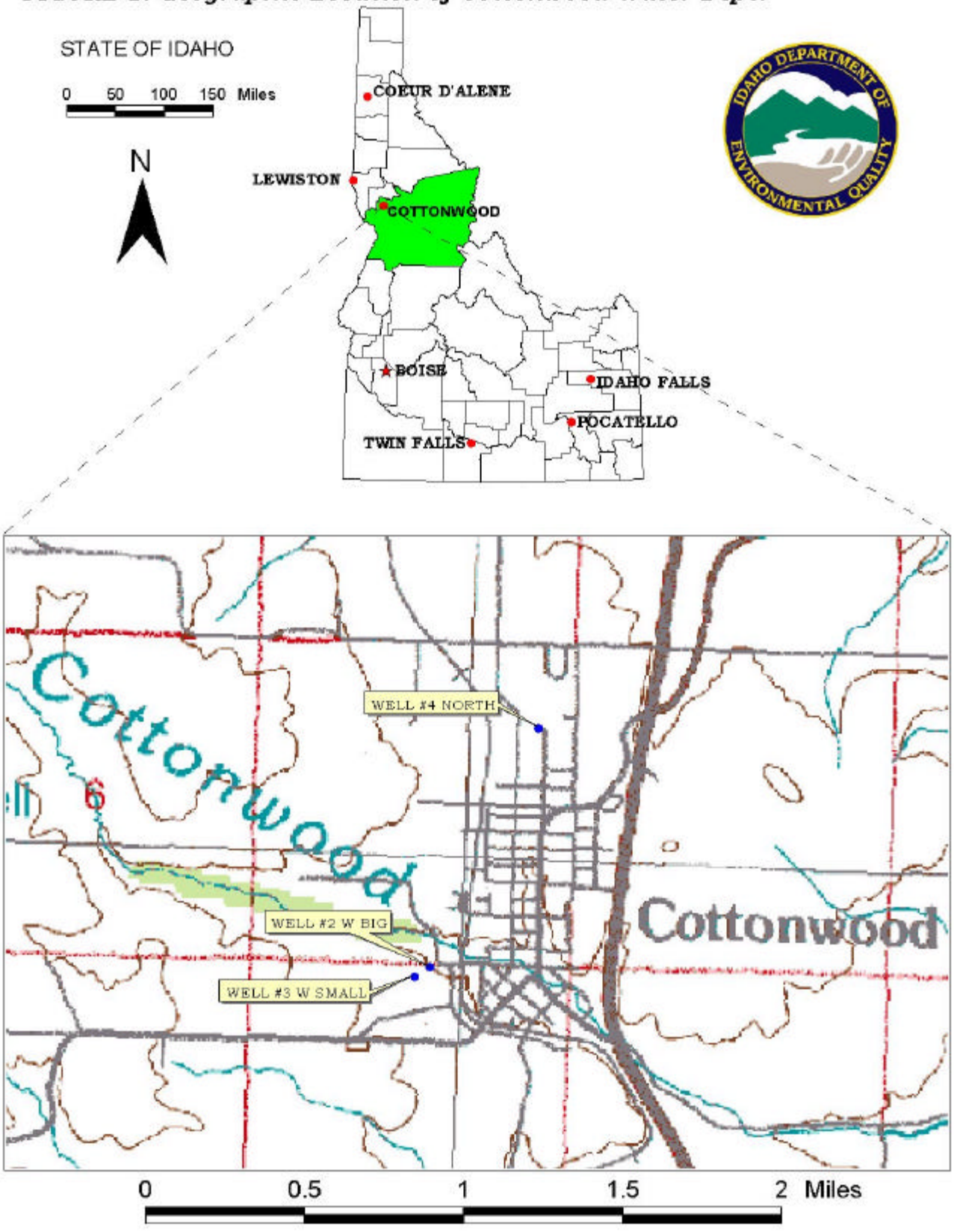
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the basalt aquifer of the Clearwater Plateau in the vicinity of the Cottonwood Water Department wells. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including the Cottonwood Water Department well logs, operator input, local area well logs, and hydrogeologic reports (detailed below).

The conceptual hydrogeologic model for the area of the Cottonwood Water Department source wells is based on little known information and scarce data. Geologic maps at a scale of 1:250,000 were used to interpret the geology (Gaston and Bennett, 1979; Rember and Bennett, 1979). The Cottonwood source wells supply water to the Cottonwood community. Three nearby surface water bodies are thought to influence the ground water flow regime; these are the Salmon River, Johns Creek, and Graves Creek. Based on logs of nearby wells, the wells are located in fractured basalt.

Wells located in basalt aquifers in northern Idaho produce up to 2,500 gpm. Discharge from the Cottonwood wells is less than 500 gpm. Most of the ground water found in basalts is present in the vesicular contact, fracture zones, or in the sediments between basalt flows. Static water level data exist for all source wells.

Grande Ronde basalt covers most of the Cottonwood area with a small exposure of Imnaha basalt (Rember and Bennett, 1979). Seven Devils volcanics and granite bound the area to the north and west. The contact between the basalt and volcanics is a hydrogeologic barrier. Water recharges at the contact from precipitation but particularly at the locations where streams flow. The source wells derive water the fractured basalt aquifer. The general regional direction of ground water flow is to the south toward

***FIGURE 1. Geographic Location of Cottonwood Water Dept.***



the Salmon River. However, local ground water flow is to the north if the data from the test points are assumed to be reliable.

The geology of the Cottonwood area is very complex. Based on the geologic maps by Gaston and Bennett (1979) and Rember and Bennett (1979) several structural features exist in the near-field area of Cottonwood. It is unknown whether these features are barriers to flow; although, the water elevations in the test points support the location of the geologic features by changes in the direction of flow and unreasonably steep hydraulic gradients between them. Given these geologic complexities and the limited data, the capture zones presented herein must be taken as best estimates. If more data become available in the future, these delineations should be adjusted based on additional modeling incorporating the new data.

The Salmon River cuts through hundreds of feet of basalt near Cottonwood. The river is assumed to gain water from the rock and discharges into the Snake River. The Salmon River is thought to be gaining for this reason and because it flows all year. Water in the river during baseflow conditions is from ground water.

Johns Creek and Graves Creek are also thought to be gaining because they flow year round. Headwaters of Johns Creek begin about 9,850 feet southeast of the Monastery of St. Gertrudes. The headwaters of Graves Creek begin about 52,500 feet southeast of the Monastery of St. Gertrudes. The creeks merge, downcut into the basalt and discharge into the Salmon River approximately 59,000 feet south of Cottonwood.

No aquifer recharge data are available for the Cottonwood area. In a study by Wyatt-Jaykim (1994) recharge to the central basin (Lewiston basin) was modeled as 1 inch/year; 2 inches/year was selected in the higher areas. Because the Cottonwood area lies at a much higher elevation than much of the basin, precipitation rates are much higher, the nearby town of Grangeville at 22.7 inches/year (Castelin, 1976) versus 13 inches/year in Lewiston-Clarkston (Cohen and Ralston, 1980). Recharge is therefore expected to be greater.

The delineated source water assessment areas for the Cottonwood Water Department wells can best be described as elliptical to pie-shaped corridors that extend to the north (Well #4 North) and southwest (Well #2 W Big and Well #3 W Small). Wells #2 W Big and #3 W Small share the same delineation (Figure 2, Attachment A). The Well #4 North delineation is approximately 2 miles long and about 0.8 mile wide extending north along Highway 95 (Figure 3, Attachment A). The actual data used by the University of Idaho in determining the source water assessment delineation areas are available from DEQ upon request.

**Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the Cottonwood Water Department wells consists of urban, residential, and a major transportation corridor, while the surrounding area is predominantly irrigated agriculture.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

**Contaminant Source Inventory Process**

A two-phased contaminant inventory of the study area was conducted in October and November 2001. The first phase involved identifying and documenting potential contaminant sources within the Cottonwood Water Department source water assessment areas (Figures 2 and 3) through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the area.

The Well #2 W Big and #3 W Small delineation (Figure 2 and Table A-1, Attachment A) has two stone quarries and a sand and gravel pit as the only potential contaminant sources. The Well #4 North delineation (Figure 3 and Table A-2, Attachment A) crosses the Camas Prairie Railnet and Highway 95, and also contains numerous commercial businesses. There is a mine regulated by the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and a grain grower regulated by the Superfund Amendments and Reauthorization Act (SARA). In addition, the system should be aware that a spill on the section of Highway 95 contained within the delineations has a chance to contribute all classes of contamination to the aquifer.

**Section 3. Susceptibility Analyses**

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment B contains the susceptibility analysis worksheets for the system. The following summaries describe the rationale for the susceptibility ranking.

**Hydrologic Sensitivity**

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity is moderate for all three wells (Table 1). Regional soil data places the delineations within poor to moderate drained soils. In addition, the Well #4 North well log indicates the presence of greater than 50 feet of clay layers interspersed within the fractured basalt layers. The vadose zones in the wells are a combination of fractured rock and gravel.

**Well Construction**

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced. A sanitary survey was conducted in 2001. All three wells have moderate system construction scores.

Well #2 W Big, drilled in 1958 to a depth of 604 feet and deepened in 1999 to 750 feet, has 12-inch casing installed to 312 feet below ground surface (bgs) into ‘dark basalt’. No information was available as to the placement of the annular seal or the main producing zone. The sanitary survey states that the well is adequately sealed and is protected from surface runoff.

Well #3 W Small, drilled in 1968, has 0.188-inch thick, 8-inch casing to 270 feet bgs into ‘hard basalt.’ The annular seal was placed to 21 feet bgs into ‘medium hard basalt solid’ below a gravel layer. The casing was perforated from 200 feet bgs to 245 feet bgs. The main production zone is greater than 100 feet below the static water table. The sanitary survey states that surface flooding may influence the well, but that the well is adequately sealed.

Well #4 North, drilled in 1977 with a 10-inch diameter casing has a depth of 836 feet crossing numerous fractured basalt areas, but no information regarding the placement of casing, annular seal, or production zones. The sanitary survey states that the airline is terminated less than 18 inches above the floor, but that the well is adequately sealed.

A determination was made as to whether current public water system (PWS) construction standards are being met. Though the wells may have been in compliance with standards when they were completed, current PWS well construction standards are more stringent. The Idaho Department of Water

Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Six-inch diameter wells require a casing thickness of at least 0.288-inches and 8-inch diameter and larger casing requires 0.322-inch thick casing. The wells were assessed an additional point in the system construction rating.

**Potential Contaminant Source and Land Use**

Wells #2 W Big and #3 W Small rated moderate for IOCs (i.e. nitrates, arsenic), and low for VOCs (i.e. petroleum products, chlorinated solvents), SOCs (i.e. pesticides), and microbial contaminants (i.e. bacteria). The agricultural land of the delineation accounted for the largest contribution of points to the potential contaminant inventory rating.

Well #4 North has a high land use rating to IOCs, VOCs, and SOCs due to numerous commercial businesses within the 3-year TOT. The well rated low for microbial contamination because the numerous potential sources were not of the sort to be a major contributors of bacteria. Both the Camas Prairie Railnet and Highway 95 cross the delineation in all three TOT zones. A spill from either of these transportation corridors could contribute all forms of contamination to the aquifer.

**Final Susceptibility Ranking**

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, if there are contaminant sources located within 50 feet of the source then the wellhead will automatically get a high susceptibility rating. In this case, Well #3 W Small automatically rated high for microbial contaminants because of total coliform detections in August 1993 and May 1994. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, the wells rated moderate for all categories, except as noted above.

**Table 1. Summary of Cottonwood Water Department Susceptibility Evaluation**

| Well | **Susceptibility Scores[1]** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hydrologic Sensitivity | Contaminant Inventory | | | | System Construction | **Final Susceptibility Ranking** | | | |
| | | IOC | VOC | SOC | Microbials | | IOC | VOC | SOC | Microbials |
| #2 W Big | M | M | L | L | L | M | M | M | M | M |
| #3 W Small | M | M | L | L | L | M | M | M | M | H*[2] |
| #4 North | M | H | H | H | L | M | M | M | M | M |

**[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility, IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

**[2] H* = Well #3 W Small automatically rated high due to total coliform detections in August 1993 and May 1994**

**Susceptibility Summary**

Overall, the wells rated moderate for all categories, except for Well #3 W Small which automatically rated high for microbial contamination. The poorly drained soils and deep nature of the wells, combined with few potential contaminant sources contributed to the overall scores. More complete well logs could help lower the system construction and the overall scores.

There are no significant water problems currently affecting the Cottonwood Water Department source water. The IOCs fluoride, barium, and nitrate have been detected, but at levels below the MCLs as set by the EPA. No SOCs have been detected in the well water. In August 1993 and May 1994, total coliform bacteria were detected at Well #3 W Small. In May 1993, the VOC chloroform was detected at Well #3 W Small, but this chemicals is a by-product of a chlorine disinfection system and not a problem with the source water.

## Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Cottonwood Water Department system drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Also, disinfection practices should be maintained and observed so volatile disinfection by-products do not enter the drinking water system. No chemicals should be stored or applied within the 50-foot radius of the wellheads. The Cottonwood Water Department should look into removing the road that is approximately 30 feet from Well #2 W Big. A contingency plan should be established to deal with any contamination and possible spills from Highway 95. As much of the designated protection areas are outside the direct jurisdiction of the Cottonwood Water Department, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection. In addition, the well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations encompass much urban and commercial land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there is a major transportation corridor through the Well #4 North delineation, the Idaho Department of Transportation should be involved in protection activities.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e.

good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the DEQ or the Idaho Rural Water Association.

**Assistance**

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: http://www2.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with drinking water protection (formerly wellhead protection) strategies.

# POTENTIAL CONTAMINANT INVENTORY
# LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks) –** Sites with aboveground storage tanks.

**Business Mailing List –** This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS –** This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site –** DEQ permitted and known historical sites/facilities using cyanide.

**Dairy –** Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well –** Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain –** This is a coverage of the 100year floodplains.

**Group 1 Sites –** These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area –** Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill –** Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area –** Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

**NPDES (National Pollutant Discharge Elimination System) –** Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas –** These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point –** This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS –** Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) –** These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank) –** Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads –** These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

**References Cited**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# Attachment A

# Cottonwood Water Department
# Delineation Figures and
# Potential Contaminant Tables

*Figure 2. Cottonwood Water Department Delineation Map and Potential Contaminant Source Locations*

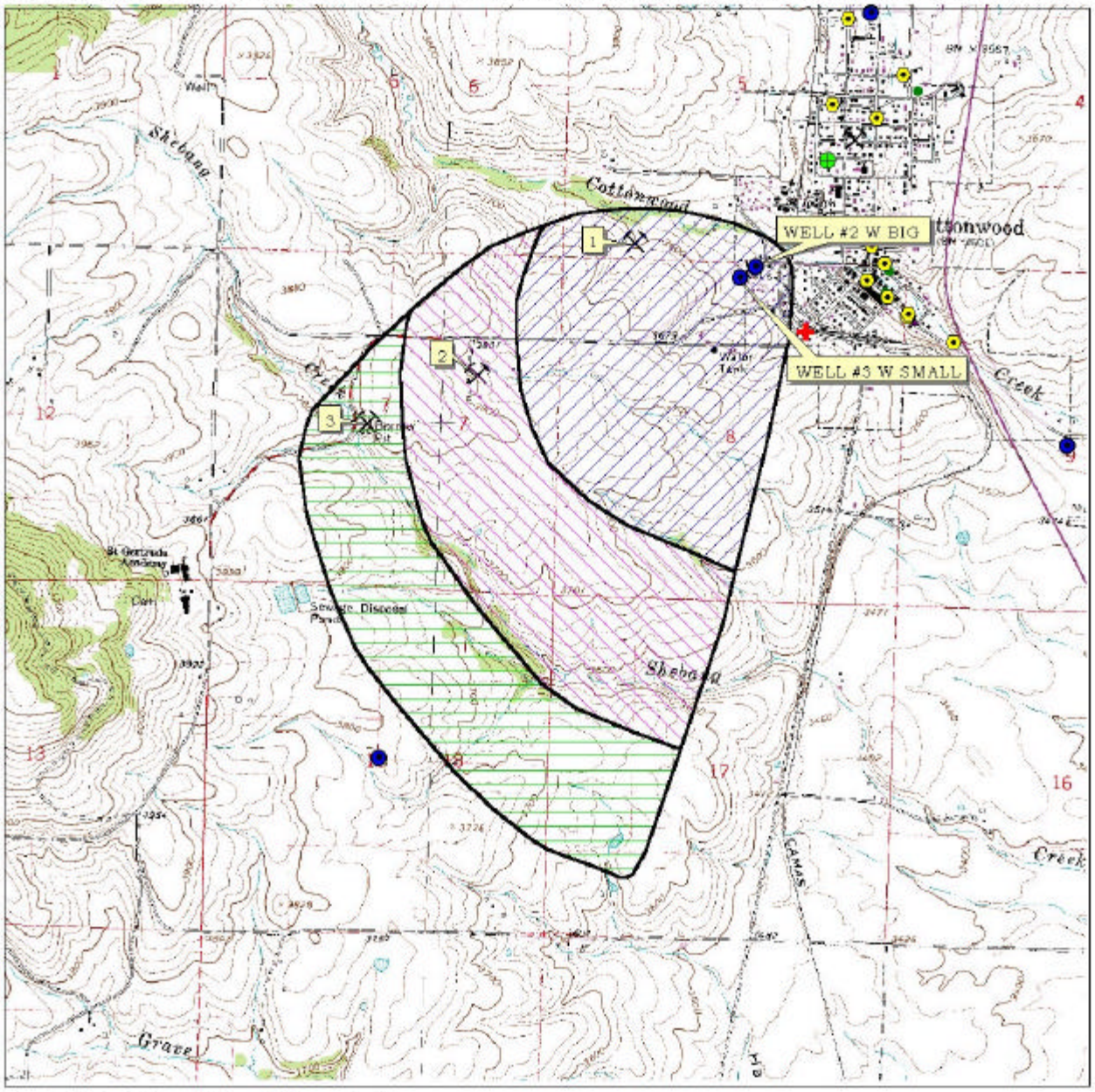

*Figure 3. Cottonwood Water Department Delineation Map and Potential Contaminant Source Locations*

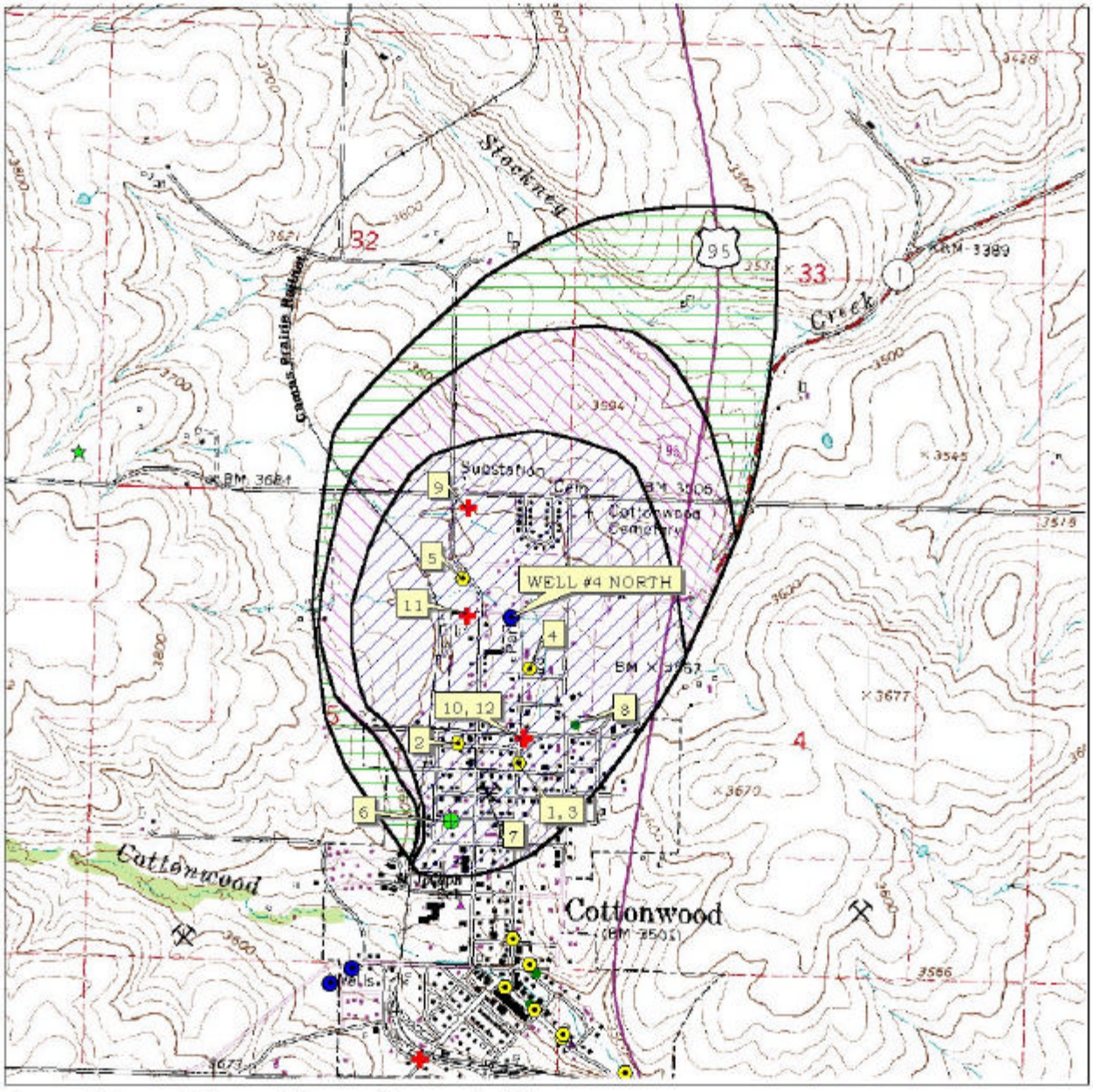

**Table A-1. Cottonwood Water Department Wells #2 W Big and #3 W Small, Potential Contaminant Inventory**

| Site # | Source Description[1] | TOT ZONE[2] | Source of Information | Potential Contaminants[3] |
|---|---|---|---|---|
| 1 | Stone quarry | 0-3 | Database Search | IOC |
| 2 | Stone quarry | 3-6 | Database Search | IOC |
| 3 | Sand and gravel pit | 6-10 | Database Search | IOC |

**[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**
**[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

**Table A-2. Cottonwood Water Department Well #4 North, Potential Contaminant Inventory**

| Site # | Source Description[1] | TOT ZONE[2] | Source of Information | Potential Contaminants[3] |
|---|---|---|---|---|
| 1 | UST – Open | 0-3 | Database Search | VOC, SOC |
| 2 | Historical Carpet & Rug Cleaner | 0-3 | Database Search | none |
| 3 | Bus Lines | 0-3 | Database Search | VOC, SOC |
| 4 | Funeral Directors | 0-3 | Database Search | IOC, SOC |
| 5 | Building Contractors | 0-3 | Database Search | IOC, VOC, SOC |
| 6 | CERCLA Site | 0-3 | Database Search | IOC |
| 7 | Historical leveled stone mine | 0-3 | Database Search | none |
| 8 | SARA Site – grain and field beans | 0-3 | Database Search | IOC, SOC, Microbes |
| 9 | Heavy equipment and truck repair, cleaning | 0-3 | Enhanced Inventory | IOC, VOC, SOC |
| 10, 12 | Car wash, Historical gas station | 0-3 | Enhanced Inventory | IOC, VOC, SOC |
| 11 | Mini storage | 0-3 | Enhanced Inventory | IOC, VOC, SOC |
| | Camas Prairie Railnet | 0-10 | GIS Map | IOC, VOC, SOC, Microbes |
| | Highway 95 | 0-10 | GIS Map | IOC, VOC, SOC, Microbes |

**[1] UST = underground storage tank, CERCLA = Comprehensive Environmental Response Compensation and Liability Act, SARA = Superfund Amendments and Reauthorization Act**
**[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**
**[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

# Attachment B

# Cottonwood Water Department
# Susceptibility Analysis
# Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report  Public Water System Name : COTTONWOOD WATER DEPT  Well# : WELL #2 W BIG

Public Water System Number 2250013  11/28/2001 9:21:42 AM

| 1. System Construction | | SCORE | | | | |
|---|---|---|---|---|---|---|
| Drill Date | | 12/03/1958 | | | | |
| Driller Log Available | | YES | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | | YES | 2001 | | | |
| Well meets IDWR construction standards | | NO | 1 | | | |
| Wellhead and surface seal maintained | | YES | 0 | | | |
| Casing and annular seal extend to low permeability unit | | NO | 2 | | | |
| Highest production 100 feet below static water level | | NO | 1 | | | |
| Well located outside the 100 year flood plain | | YES | 0 | | | |
| | Total System Construction Score | | 4 | | | |
| 2. Hydrologic Sensitivity | | | | | | |
| Soils are poorly to moderately drained | | YES | 0 | | | |
| Vadose zone composed of gravel, fractured rock or unknown | | YES | 1 | | | |
| Depth to first water > 300 feet | | NO | 1 | | | |
| Aquitard present with > 50 feet cumulative thickness | | NO | 2 | | | |
| | Total Hydrologic Score | | 4 | | | |
| 3. Potential Contaminant / Land Use - ZONE 1A | | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | IRRIGATED PASTURE | | 1 | 1 | 1 | 1 |
| Farm chemical use high | | NO | 0 | 0 | 0 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | | NO | NO | NO | NO | NO |
| | Total Potential Contaminant Source/Land Use Score - Zone 1A | | 1 | 1 | 1 | 1 |
| Potential Contaminant / Land Use - ZONE 1B | | | | | | |
| Contaminant sources present (Number of Sources) | | YES | 1 | 0 | 0 | 0 |
| (Score = # Sources X 2 ) 8 Points Maximum | | | 2 | 0 | 0 | 0 |
| Sources of Class II or III leacheable contaminants or | | YES | 4 | 0 | 0 | |
| 4 Points Maximum | | | 4 | 0 | 0 | |
| Zone 1B contains or intercepts a Group 1 Area | | NO | 0 | 0 | 0 | 0 |
| Land use Zone 1B | Greater Than 50% Irrigated Agricultural Land | | 4 | 4 | 4 | 4 |
| | Total Potential Contaminant Source / Land Use Score - Zone 1B | | 10 | 4 | 4 | 4 |
| Potential Contaminant / Land Use - ZONE II | | | | | | |
| Contaminant Sources Present | | YES | 2 | 0 | 0 | |
| Sources of Class II or III leacheable contaminants or | | YES | 1 | 0 | 0 | |
| Land Use Zone II | Greater Than 50% Irrigated Agricultural Land | | 2 | 2 | 2 | |
| | Potential Contaminant Source / Land Use Score - Zone II | | 5 | 2 | 2 | 0 |
| Potential Contaminant / Land Use - ZONE III | | | | | | |
| Contaminant Source Present | | YES | 1 | 0 | 0 | |
| Sources of Class II or III leacheable contaminants or | | YES | 1 | 0 | 0 | |
| Is there irrigated agricultural lands that occupy > 50% of | | YES | 1 | 1 | 1 | |
| | Total Potential Contaminant Source / Land Use Score - Zone III | | 3 | 1 | 1 | 0 |
| Cumulative Potential Contaminant / Land Use Score | | | 19 | 8 | 8 | 5 |
| 4. Final Susceptibility Source Score | | | 12 | 10 | 10 | 10 |
| 5. Final Well Ranking | | | Moderate | Moderate | Moderate | Moderate |

Ground Water Susceptibility Report  Public Water System Name : COTTONWOOD WATER DEPT  Well# : WELL #3 W SMALL

Public Water System Number 2250013  11/28/2001 9:21:54 AM

| 1. System Construction | | SCORE | | | | |
|---|---|---|---|---|---|---|
| Drill Date | | 05/30/1968 | | | | |
| Driller Log Available | | YES | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | | YES | 2001 | | | |
| Well meets IDWR construction standards | | NO | 1 | | | |
| Wellhead and surface seal maintained | | YES | 0 | | | |
| Casing and annular seal extend to low permeability unit | | NO | 2 | | | |
| Highest production 100 feet below static water level | | YES | 0 | | | |
| Well located outside the 100 year flood plain | | NO | 1 | | | |
| | Total System Construction Score | | 4 | | | |
| 2. Hydrologic Sensitivity | | | | | | |
| Soils are poorly to moderately drained | | YES | 0 | | | |
| Vadose zone composed of gravel, fractured rock or unknown | | YES | 1 | | | |
| Depth to first water > 300 feet | | NO | 1 | | | |
| Aquitard present with > 50 feet cumulative thickness | | NO | 2 | | | |
| | Total Hydrologic Score | | 4 | | | |
| 3. Potential Contaminant / Land Use - ZONE 1A | | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | IRRIGATED PASTURE | | 1 | 1 | 1 | 1 |
| Farm chemical use high | | NO | 0 | 0 | 0 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | | YES | NO | NO | NO | YES |
| | Total Potential Contaminant Source/Land Use Score - Zone 1A | | 1 | 1 | 1 | 1 |
| Potential Contaminant / Land Use - ZONE 1B | | | | | | |
| Contaminant sources present (Number of Sources) | | YES | 1 | 0 | 0 | 0 |
| (Score = # Sources X 2 ) 8 Points Maximum | | | 2 | 0 | 0 | 0 |
| Sources of Class II or III leacheable contaminants or | | YES | 4 | 0 | 0 | |
| 4 Points Maximum | | | 4 | 0 | 0 | |
| Zone 1B contains or intercepts a Group 1 Area | | NO | 0 | 0 | 0 | 0 |
| Land use Zone 1B | Greater Than 50% Irrigated Agricultural Land | | 4 | 4 | 4 | 4 |
| | Total Potential Contaminant Source / Land Use Score - Zone 1B | | 10 | 4 | 4 | 4 |
| Potential Contaminant / Land Use - ZONE II | | | | | | |
| Contaminant Sources Present | | YES | 2 | 0 | 0 | |
| Sources of Class II or III leacheable contaminants or | | YES | 1 | 0 | 0 | |
| Land Use Zone II | Greater Than 50% Irrigated Agricultural Land | | 2 | 2 | 2 | |
| | Potential Contaminant Source / Land Use Score - Zone II | | 5 | 2 | 2 | 0 |
| Potential Contaminant / Land Use - ZONE III | | | | | | |
| Contaminant Source Present | | YES | 1 | 0 | 0 | |
| Sources of Class II or III leacheable contaminants or | | YES | 1 | 0 | 0 | |
| Is there irrigated agricultural lands that occupy > 50% of | | YES | 1 | 1 | 1 | |
| | Total Potential Contaminant Source / Land Use Score - Zone III | | 3 | 1 | 1 | 0 |
| Cumulative Potential Contaminant / Land Use Score | | | 19 | 8 | 8 | 5 |
| 4. Final Susceptibility Source Score | | | 12 | 10 | 10 | 10 |
| 5. Final Well Ranking | | | Moderate | Moderate | Moderate | High |

Ground Water Susceptibility Report  Public Water System Name : COTTONWOOD WATER DEPT  Well# : WELL #4 NORTH

Public Water System Number 2250013  11/28/2001 9:22:06 AM

| 1. System Construction | | SCORE | | | | |
|---|---|---|---|---|---|---|
| Drill Date | 03/14/1977 | | | | | |
| Driller Log Available | YES | | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | YES | 2001 | | | | |
| Well meets IDWR construction standards | NO | 1 | | | | |
| Wellhead and surface seal maintained | YES | 0 | | | | |
| Casing and annular seal extend to low permeability unit | NO | 2 | | | | |
| Highest production 100 feet below static water level | YES | 0 | | | | |
| Well located outside the 100 year flood plain | NO | 1 | | | | |
| Total System Construction Score | | 4 | | | | |
| **2. Hydrologic Sensitivity** | | | | | | |
| Soils are poorly to moderately drained | YES | 0 | | | | |
| Vadose zone composed of gravel, fractured rock or unknown | YES | 1 | | | | |
| Depth to first water > 300 feet | NO | 1 | | | | |
| Aquitard present with > 50 feet cumulative thickness | YES | 0 | | | | |
| Total Hydrologic Score | | 2 | | | | |
| **3. Potential Contaminant / Land Use - ZONE 1A** | | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | IRRIGATED PASTURE | | 1 | 1 | 1 | 1 |
| Farm chemical use high | NO | | 0 | 0 | 0 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | NO | | NO | NO | NO | NO |
| Total Potential Contaminant Source/Land Use Score - Zone 1A | | | 1 | 1 | 1 | 1 |
| **Potential Contaminant / Land Use - ZONE 1B** | | | | | | |
| Contaminant sources present (Number of Sources) | YES | | 9 | 8 | 10 | 3 |
| (Score = # Sources X 2 ) 8 Points Maximum | | | 8 | 8 | 8 | 6 |
| Sources of Class II or III leacheable contaminants or | YES | | 4 | 4 | 4 | |
| 4 Points Maximum | | | 4 | 4 | 4 | |
| Zone 1B contains or intercepts a Group 1 Area | NO | | 0 | 0 | 0 | 0 |
| Land use Zone 1B | 25 to 50% Irrigated Agricultural Land | | 2 | 2 | 2 | 2 |
| Total Potential Contaminant Source / Land Use Score - Zone 1B | | | 14 | 14 | 14 | 8 |
| **Potential Contaminant / Land Use - ZONE II** | | | | | | |
| Contaminant Sources Present | YES | | 2 | 2 | 2 | |
| Sources of Class II or III leacheable contaminants or | YES | | 1 | 1 | 1 | |
| Land Use Zone II | Greater Than 50% Irrigated Agricultural Land | | 2 | 2 | 2 | |
| Potential Contaminant Source / Land Use Score - Zone II | | | 5 | 5 | 5 | 0 |
| **Potential Contaminant / Land Use - ZONE III** | | | | | | |
| Contaminant Source Present | YES | | 1 | 1 | 1 | |
| Sources of Class II or III leacheable contaminants or | YES | | 1 | 1 | 1 | |
| Is there irrigated agricultural lands that occupy > 50% of | YES | | 1 | 1 | 1 | |
| Total Potential Contaminant Source / Land Use Score - Zone III | | | 3 | 3 | 3 | 0 |
| **Cumulative Potential Contaminant / Land Use Score** | | | 23 | 23 | 23 | 9 |
| **4. Final Susceptibility Source Score** | | | 11 | 11 | 11 | 9 |
| **5. Final Well Ranking** | | | Moderate | Moderate | Moderate | Moderate |